

CLAIMS

WHAT IS CLAIMED IS:

1. A film-forming composition comprising a continuous aqueous phase and a dispersed phase, the dispersed phase comprising (i) a particulate polymer or emulsified liquid prepolymer, and (ii) a coalescent aid comprising an ester having the formula RCOOX wherein R and X are independently hydrocarbyl or substituted hydrocarbyl and at least one of R and X comprises at least two unsaturated carbon-carbon bonds.
2. The film-forming composition of claim 1 wherein R and X independently comprise about 1 to about 30 carbon atoms.
3. The film-forming composition of claim 1 wherein R and X independently comprise about 1 to about 30 carbon atoms and, in combination, contain no more than about 35 carbon atoms.
4. The film-forming composition of claim 1 wherein R and X each contain an unsaturated carbon-carbon bond.
5. The film-forming composition of claim 1 wherein R comprises at least two unsaturated carbon-carbon bonds in conjugation.
6. The film-forming composition of claim 1 wherein R or X is substituted hydrocarbyl and the hydrocarbyl substituent is selected from the group consisting of ketones, esters, alcohols, amides, halogens, urea, urethane, and nitrile substituents.
7. The film-forming composition of claim 1 wherein the ester is prepared by the transesterification reaction between a fatty acid and a glycol.
8. The film-forming composition of claim 1 wherein the ester is an ester derived from a fatty acid of soybean oil, canola oil, or linseed oil.

9. The film-forming composition of claim 1 wherein the ester is an ethylene glycol monoester derived from a fatty acid of soybean oil.

10. The film-forming composition of claim 1 wherein the ester is an diethylene glycol monoester derived from a fatty acid of soybean oil.

11. The film-forming composition of claim 1 wherein the ester is a propylene glycol monoester derived from a fatty acid of soybean oil.

12. The film-forming composition of claim 1 wherein the ester is a dipropylene glycol monoester derived from a fatty acid of soybean oil.

13. The film-forming composition of claim 1 wherein the ester is a methyl ester derived from a fatty acid of soybean oil.

14. The film-forming composition of claim 7 wherein the fatty acid is a fatty acid derived from soybean oil.

15. The film-forming composition of claim 1 wherein the weight of the ester is about 0.1 % to about 50 % of the weight of the particulate polymer or liquid pre-polymer.

16. The film-forming composition of claim 1 wherein the weight of the ester is about 0.1 % to about 4 % of the weight of the particulate polymer or liquid pre-polymer.

17. The film-forming composition of claim 1 wherein the continuous aqueous phase constitutes at least about 20 wt. % of the film-forming composition.

18. The film-forming composition of claim 17 wherein the ester is an ester derived from a fatty acid of soybean oil, canola oil, or linseed oil.

19. The film-forming composition of claim 1 wherein the dispersed or continuous aqueous phase further comprises an additive selected from the group consisting of wetting aids, dispersants, thickeners, defoaming agents, biocides, algicides, ultra-violet inhibitors, flow agents, levelling agents, reology modifiers, freeze thaw stabilizing agents, pH modifiers, flash rust inhibitors, and biocides.

20. The film-forming composition of claim 1 wherein the film-forming composition comprises a mixture of coalescent aids and the ester comprises at least about 5 wt. % of the mixture.

21. The film-forming composition of claim 1 wherein the ester is derived from a fatty acid contained in an oil obtained from a plant or animal and the unsaturated fatty acid comprises at least about 25 wt. % of the fatty acid content of the oil.

22. The film-forming composition of claim 1 wherein the film-forming composition comprises a mixture of coalescent aids, the ester comprises at least about 5 wt. % of the mixture, the ester is derived from a fatty acid contained in an oil obtained from a plant or animal, and the unsaturated fatty acid comprises at least about 25 wt. % of the fatty acid content of the oil.

23. The film-forming composition of claim 1 wherein the film-forming composition comprises a mixture of coalescent aids, the ester comprises at least about 5 wt. % of the mixture, the ester is derived from a fatty acid contained in an oil obtained from a plant or animal, and the unsaturated fatty acid comprises at least about 50 wt. % of the fatty acid content of the oil.

24. The film-forming composition of claim 23 wherein the film-forming composition contains at least about 20 wt. % water.

25. The film-forming composition of claim 23 wherein the film-forming composition contains at least about 20 wt. % water, at least about 10 wt. %

particulate polymer or liquid pre-polymer, and the weight of the ester is about 0.1 % to about 50 % of the weight of the particulate polymer or liquid pre-polymer.

26. The film-forming composition of claim 1 wherein the film-forming composition contains at least about 20 wt. % water, at least about 10 wt. % particulate polymer or liquid pre-polymer, and the weight of the ester is about 0.1 % to about 50 % of the weight of the particulate polymer or liquid pre-polymer.

27. The film-forming composition of claim 26 wherein at least 95 wt. % of the ester is dissolved in the particulate polymer or liquid pre-polymer.

28. The film-forming composition of claim 1 wherein at least 95 wt. % of the ester is dissolved in the particulate polymer or liquid pre-polymer.

29. The film-forming composition of claim 1 wherein the continuous aqueous phase contains less than about 10 wt. % organic solvent.

30. The film-forming composition of claim 1 wherein at least 95 wt. % of the ester is dissolved in the particulate polymer or liquid pre-polymer and the continuous aqueous phase contains less than about 10 wt. % organic solvent.

31. The film-forming composition of claim 30 wherein the film-forming composition contains at least about 20 wt. % water, at least about 10 wt. % particulate polymer or liquid pre-polymer, and the weight of the ester is about 0.1 % to about 50 % of the weight of the particulate polymer or liquid pre-polymer.

32. The film-forming composition of claim 31 wherein the film-forming composition comprises a mixture of coalescent aids, the ester comprises at least about 5 wt. % of the mixture, the ester is derived from a fatty acid contained in an oil found in a plant or animal, and the unsaturated fatty acid comprises at least about 50 wt. % of the fatty acid content of the oil.

33. The film-forming composition of claim 30 wherein the film-forming composition comprises a mixture of coalescent aids, the ester comprises at least about 5 wt. % of the mixture, the ester is derived from a fatty acid contained in an oil found in a plant or animal, and the unsaturated fatty acid comprises at least about 50 wt. % of the fatty acid content of the oil.

34. A film-forming composition comprising at least about 10 wt. % of a continuous aqueous phase and a dispersed phase, the dispersed phase comprising (i) a particulate polymer or emulsified liquid prepolymer, and (ii) a coalescent aid comprising an ester derived from a fatty acid contained in an oil found in a plant or animal, the ester having the formula RCOOX wherein R and X are independently hydrocarbyl or substituted hydrocarbyl and at least one of R and X comprises at least two unsaturated carbon-carbon bonds.

35. The film-forming composition of claim 34 wherein at least 95 wt. % of the ester is dissolved in the particulate polymer or liquid pre-polymer and the continuous aqueous phase contains less than about 10 wt. % organic solvent, based upon the weight of the continuous phase.

36. The film-forming composition of claim 35 wherein the film-forming composition contains at least about 20 wt. % water, at least about 10 wt. % particulate polymer or liquid pre-polymer, and the weight of the ester is about 0.1 % to about 50 % of the weight of the particulate polymer or liquid pre-polymer.

37. The film-forming composition of claim 35 wherein the film-forming composition comprises a mixture of coalescent aids, the ester comprises at least about 5 wt. % of the mixture, the ester is derived from a fatty acid contained in an oil found in a plant or animal, and the unsaturated fatty acid comprises at least about 50 wt. % of the fatty acid content of the oil.

38. The film-forming composition of claim 34 wherein the film-forming composition comprises a mixture of coalescent aids, the ester comprises at least

about 5 wt. % of the mixture, the ester is derived from a fatty acid contained in an oil found in a plant or animal, and the unsaturated fatty acid comprises at least about 50 wt. % of the fatty acid content of the oil.